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10/725,795

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EXAMINER

JOLLEY, KIRSTEN

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

11/01/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/725,795

Applicant(s)

OU-YANG, CHIEH

Examiner

Kirsten C. Jolley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 14, 2007 has been entered.

### ***Response to Amendments/Arguments***

2. The claim objections and 35 USC 112, 2<sup>nd</sup> paragraph rejections set forth in the prior Office action have been withdrawn in response to Applicant's amendments to and/or cancellations of the claims. Further, the 35 USC 102(b) rejection of claim 14 has been withdrawn in response to Applicant's cancellation of the claim.

3. In response to the amendments to claim 1 broadening its scope, rejections over the previously-cited prior art of Kim et al. taken in view of Thakur are set forth below.

4. Applicant's arguments filed July 10, 2007 have been fully considered but they are not persuasive.

With respect to the rejections over Shirley, Applicant argues that in the Shirley reference, in the context of a substrate that has been provided with a "primer," it is the substrate that is conditioned via orifices 55a and not the applied "primer." Applicant states that Shirley never

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hints at conditioning the applied primer for any reason, and further that there is no indication that such a primer would have been applied in a liquid state. The Examiner notes that the thermal conditioning of the substrate would necessarily similarly result in thermal conditioning of the coating applied thereon. As to whether the primer is applied in a liquid state, the Examiner acknowledges that the primer of Shirley is not necessarily in the form of a liquid.

However, the Examiner maintains the second position taken -- that it would have been obvious to have incorporated the features of the chill plate into the coater bowl assembly as stated in col. 5, lines 10-15, and as discussed in the final Office action. Applicant argues that this quoted section does not imply that the manifold/nozzle/orifice arrangement in the coater bowl assembly 30 can be relocated above the substrate 70 instead of below it, but rather merely describes an alternative to the first embodiment described in the previous paragraph where a plurality of heat exchangers and manifolds are used instead of a single heat exchanger and manifold. The Examiner disagrees. Column 5, lines 10-14 state that "the bowl temperature controller 50b can include a plurality of heat exchangers 52b and manifolds 54b, arranged in a manner generally similar to that discussed above with reference to the *plate temperature controller 50a*" [emphasis added]. The preceding paragraph discusses bowl temperature controller 50b, not plate temperature controller 50a. While this passage does disclose use of a plurality of heat exchangers and manifolds, it also teaches that the arrangement may be similar to that of plate temperature controller 50a. Thus it is the Examiner's position that the cited section indicates that any of the discussed features of the plate temperature controller 50a, including the location of the manifold, orifices, etc., may be incorporated into the bowl temperature controller 50b. As to Applicant's argument that placement of the central nozzle/manifold 53a from the

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chill plate assembly 20 would interfere with or displace the liquid nozzle 35, the Examiner notes that an engineer having ordinary skill in the art would recognize that some adjustments to the design would be required when incorporating the alternative suggested embodiments, and an engineer would be capable of designing a bowl controller that incorporates the alternative suggested embodiments.

***Claim Rejections - 35 USC § 102/103***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3, 6-8, and 11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shirley (US 6,322,626).

Shirley is applied for its teachings discussed above in section 3 and in the previous Office actions. Independent claim 1 requires that the coating liquid already applied on the substrate is conditioned thermally. Shirley teaches, with respect to the chill plate section of the apparatus, that orifices 55a which apply heated or cooled gas can be positioned proximate tot the front (upper) side of the substrate 72 rather than the back side 71. In col. 5, lines 10-14, Shirley

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teaches that the bowl temperature controller of the coating assembly can include a plurality of heat exchangers and manifolds arranged in a manner “generally similar to that discussed above with reference to the plate temperature controller 50a” of the chill plate assembly. Thus, it is the Examiner’s position that Shirley teaches coating the substrate in Shirley’s coater assembly using the claimed method of selective thermal conditioning by directing a stream of heated or cooled gas to the substrate from above the substrate surface.

Alternatively, it would have been obvious to one having ordinary skill in the art to have incorporated the optional embodiments of the chill plate assembly (such as positioning the orifices above the substrate rather than below the substrate) in Shirley’s coater assembly, thus supplying heating or cooling during and/or after liquid application, with the expectation of similar and successful results because both Shirley’s chill plate and coater assemblies have similar structures, effects, and purposes -- to similarly provide heating or cooling to selected areas of a substrate, and because Shirley specifically teaches the incorporation of the features of the chill plate assembly into the coater bowl assembly.

As to claims 6-7, Shirley teaches the use of sub-sources directed to different positions on the radius of the substrate.

As to claim 8, Shirley’s substrate is supported on a rotatable support, with liquid dispensing means provided above the substrate surface. While Shirley does not illustrate the disclosed embodiment where cooling and heating means are provided above the substrate, there would necessarily be fastening means for the thermal source(s) because it is not possible for the thermal means to float unsupported above a substrate.

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8. Claims 10 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirley.

As to claims 10 and 13, it would have been obvious to one having ordinary skill in the art to have provided the thermal means above the substrate on an arm because use of an arm to hold a dispenser over the top of a substrate is well known in the spin coating art, particularly since Shirley illustrates the use of an arm to hold the liquid dispenser above the substrate. Further it would have been obvious to have made the arm movable so that the substrate can be easily placed in and removed from the coater assembly. As to claim 12, it would have been obvious to have mechanically affixed the liquid dispensing means to the thermal fastening means in order to minimize and simplify the number of parts on the coater assembly.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirley as applied to claims 1 and 8 above, and further in view of Mandal et al. (US 6,238,735) or Kim et al. (US 5,932,009).

Shirley lacks the teaching of a cover extending over the rotatable support. The Examiner notes that use of a cover over a spin coating apparatus is very well known in the art. Mandal et al. and Kim et al. are cited to demonstrate the conventionality of a cover to provide an enclosed process space. It would have been obvious for one having ordinary skill in the art to have used a cover in the spin coating apparatus of Shirley in order to insulate the process space and prevent all the cooling and/or heating gases from dissipating before they can effectively cool/heat the substrate.

10. Claims 1 and 4-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US 5,932,009) taken in view of Thakur (US 6,174,651).

Kim et al. discloses a method of distributing a viscous liquid over a surface of a substrate by a spin coating process comprising: placing a substrate horizontal on a support; applying a viscous liquid onto a surface of the substrate; rotating the substrate to distribute the liquid radially outwards; and conditioning the liquid on the substrate thermally to influence its viscosity locally. Kim et al. teaches using infrared radiation to locally heat the coated substrate (col. 4, lines 48-65). Kim et al. teaches that a plurality of optical cables for guiding infrared radiation may be positioned at different radial locations under the chuck (see Figure 5 and col. 5, lines 25-31). Kim et al. lacks a teaching of placing the radiation source above the surface of the substrate. However, it is noted that Kim et al. states that "In addition to the method using the infrared generator 51 and optical cable 52 for the purpose of heating the rotation chuck 113, it is possible to use other electromagnetic waves as well" (col. 5, lines 44-46).

Thakur is cited for its teaching of similarly distributing a viscous liquid over a surface of a substrate by a spin coating process and conditioning the liquid on the substrate thermally to solidify the liquid (for example by evaporation of the solvent therein - col. 7, lines 45-47). Thakur teaches and illustrates using two lamps 24, 26 which can emit optical energy by visible light which are placed above the surface of the substrate (col. 7, lines 10-23 and Figure 1A). Thakur further teaches that "As many lamps as are necessary for the process may be used and the lamps may be placed *in any suitable configuration*. The location of the lamps illustrated in the Figures is merely exemplary" [emphasis added] (col. 7, lines 61-65). Thakur also discloses "the



energy emitted by the lamps can be easily and precisely controlled and varied.” It would have been obvious for one having ordinary skill in the art, seeing the references of Kim et al. and Thakur in combination, to have heated the substrate and coating liquid thereon in a temperature gradient (as taught by Kim et al.) by using radiation applied from above the substrate (as taught by Thakur) in place of radiation applied from below the substrate with the expectation of similar, successful results.

As to claims 6-7, according to the method of Kim et al., the radiation is directed to multiple different positions with regard to the radius on the substrate.

As to claims 8 and 10, in Kim et al., the substrate is supported on a rotatable support, with liquid dispensing means provided above the substrate surface. Thakur illustrates the use of fastening means, including an arm, to hold the thermal sources above the substrate.

As to claim 9, both Kim et al. and Thakur illustrate the use of a cover extending over at least part of the substrate.

As to claim 13, it would have been obvious to have made the arm holding the thermal source movable so that the substrate can be easily placed in and removed from the coater assembly in the method of Kim et al. As to claim 12, it would have been obvious to have mechanically affixed the liquid dispensing means to the thermal fastening means in order to minimize and simplify the number of parts on the coater assembly.


### *Conclusion*

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C. Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Tuesday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Kirsten C Jolley  
Primary Examiner  
Art Unit 1792

kcj